

REMARKS

The present application was filed on February 22, 2002 with claims 1 through 21. Claims 1 through 21 are presently pending in the above-identified patent application. Claims 1, 5, 7, 11, 12, 18, 19, and 21 are proposed to be amended herein.

5 In the Office Action, the Examiner objected to claim 12 due to an indicated informality. The Examiner also rejected claims 1-9 and 11-21 under 35 U.S.C. § 102(e) as being anticipated by Yu et al. (United States Patent Application Number 2003/0058520 A1). The Examiner indicated that claim 10 would be allowable if rewritten in independent form including all of the limitations of the base claims and any intervening claims.

10 The present invention is directed to a method and apparatus for adjusting the phase of an optical signal by varying the path length of the optical signal using one or more moveable mirrors. The phase adjustment techniques of the present invention may be employed in various optical devices, including 1 x n optical switches. The position of the mirrors may be controlled, for example, using micromachined control elements that physically move the mirror along the lightpath.
15 An exemplary 2-by-2 optical switch includes two waveguides configured to include a coupler region. A mirror is positioned at the output of each waveguide. The position of at least one of the mirrors may be adjusted along the optical path and the mirrors reflect the light exiting from the end of the waveguides back into the same waveguide after an adjustable phase delay due to the round trip through an adjustable air gap between the waveguides and corresponding mirrors. A received
20 optical signal is split in the coupler region into two generally equal components and the phase of at least one component of the optical signal is adjusted by controlling the relative position of the mirrors. The optical components are then recombined and the optical signal appears at the appropriate output port of the optical switch. The present invention may also be applied in wavelength selective optical switches that support multiple optical channels. A number of
25 techniques are also disclosed for fabricating optical devices in accordance with the present invention.

Claims 5, 11, 18, and 21 have been amended to correct typographical errors.

Formal Objections

Claim 12 was objected to because of the improper antecedent basis of the term “optical signal” in line 2.

Claim 12 has been amended to provide proper antecedent basis for the term “optical signal” and Applicants respectfully request that the objection to claim 12 be withdrawn.

Independent Claims 1, 7, 12 and 19

Independent claims 1, 7, 12, and 19 were rejected under 35 U.S.C. § 102(e) as being anticipated by Yu et al.

Regarding claims 1 and 7, the Examiner asserts that Yu discloses a method of and an optical device for adjusting a phase of an optical signal (FIGS. 1 and 3).

Applicants note that Yu is directed to an optical device where “light is projected at an oblique angle into the space between the micromirrors. Each reflection from the floating reflector produces an emergent beam from the floating reflector. The emergent light beams are combined with a lens. As a direct result of this structure, different wavelengths are focused to different points in the focal plane of the lens. The focal point positions of the different wavelengths can be moved by manipulating the micromirrors.” See, Abstract. The mirrors, however, are not positioned along the path of the optical signal to reflect optical signal into said path. Independent claims 1, 7, 12, and 19, as amended, require that the mirror is positioned along a path of an optical signal wherein said mirror reflects one or more components of the optical signal substantially into said path.

Thus, Yu et al. do not disclose or suggest that the mirror is positioned along a path of an optical signal wherein said mirror reflects one or more components of the optical signal substantially into said path, as required by independent claims 1, 7, 12, and 19, as amended.

Dependent Claims 2-6, 8-11, 13-18, 20 and 21

Dependent claims 2-6, 8-9, 11, 13-18, 20 and 21 were rejected under 35 U.S.C. § 102(e) as being anticipated by Yu et al.

Claims 2-6, 8-11, 13-18, and 20-21 are dependent on claims 1, 7, 12, and 19, respectively, and are therefore patentably distinguished over Yu et al. because of their dependency from amended independent claims 1, 7, 12, and 19 for the reasons set forth above, as well as other elements these claims add in combination to their base claim. The Examiner has already indicated

that claim 10 would be allowable if rewritten in independent form including all of the limitations of the base claims and any intervening claims.

All of the pending claims, i.e., claims 1 through 21, are in condition for allowance and such favorable action is earnestly solicited.

5 If any outstanding issues remain, or if the Examiner has any further suggestions for expediting allowance of this application, the Examiner is invited to contact the undersigned at the telephone number indicated below.

The Examiner's attention to this matter is appreciated.

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Respectfully submitted,



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